



SCIE 1P51  
Library Seminar  
Winter 2024 term

*Ian Gordon*



Ian Gordon, Teaching & Learning Librarian



Brock University Library

# Library Seminar Agenda

- SCIE Library Research Guide
- Databases – lots of them!
- Citation management
- Where, how and when to get help

## **Assessment Components & Due Dates**

### **Term Paper**

#### **1. Article Choice – 5%**

Choose an original research/study article from a recent peer-reviewed science journal (not earlier than January 2023) from the topics covered in Science 1p51. The article you choose for analysis **may not** be a news summary, a commentary, a letter to the editor, **nor** a review. (No social science/psychology papers). Additionally, you may not use any of the readings used in this course. A copy of your chosen article and a full reference/citation for it (APA or MLA format) is due on Brightspace Monday February 5<sup>th</sup> by 11pm. This portion of the term paper is worth **5%** of the course grade. **Failure to submit the article will result in a grade of zero for the assignment.** This is to ensure success in the term paper by the correct choice of a suitable article. A correct choice will be indicated by your grade on Brightspace, otherwise the seminar leader will email you if it was incorrect and you will have to submit a correct article.

#### **2. Paper – 15%**

Write an evaluation of the approved article, **in your own words**, no direct quotes, which must, at least, consider the following questions (~900 words).

Who the researchers are and where do they work?

What is/are the research question(s) the researchers are trying to answer?

Write a summary of the article.

Do you believe the article? Support your opinion.

The paper is due **Monday March 4<sup>th</sup>** by 11:00pm on Brightspace. A penalty, of **10%** per day of the assignment grade, will be imposed until **Friday March 8<sup>th</sup>**. No papers will be accepted after this date. Submit the article to your paper - otherwise 3% of the course grade will be deducted. Full details and a mark breakdown for this assignment will be available on Brightspace.

## Lecture Schedule

Week	Topic	Lecture Topic Reading
1 & 2	Science & Nature of Science	Vaccine Confidence and Uptake of the Omicron Bivalent Booster in Tennessee: Implications for Vulnerable Populations.
3 & 4	Tobacco Industry & Misuse of Science	Effects of chronic vapor inhalation on mouse body weight, lung morphology, and inflammatory cytokines using a low vapor exposure design.
5 & 6	Genetics & Gene Therapies	Defining curative endpoints for sickle cell disease in the era of gene therapy and gene editing.
7 & 8	Tissue Engineering & Cloning	Organs-on-chips technologies.
9 & 10	Pharmaceutical Industry	The safety assessment of cosmetic perfumes.
11 & 12	Food Additives	Food additive emulsifiers and risk of cardiovascular disease.

The lecture schedule may be subject to change. All topic readings are on Brightspace.

What are the consequences to science and society  
for the continued use of Red Dye as an  
additive in our food supply?

<https://www.google.ca/>

Google "red dye\*" food additive

All Images Shopping Videos News More Tools

About 625,000 results (0.36 seconds)

Red Dye 40 is a synthetic food dye common in dairy products, sweets, and beverages. For most people, it is safe to consume and poses no health risk, but some may be allergic to it. Red Dye 40 is one of the most widely used food dyes, as well as one of the most controversial. Jun 12, 2023

Healthline https://www.healthline.com › nutrition › red-dye-40

Red Dye 40: Safety, Side Effects, and Food List - Healthline

About featured snippets · Feedback

People also ask :

What is the red food coloring additive?

What does red 40 do to the human body?

Why was Red 40 banned?

What foods should you avoid with red dye 40?

Feedback

GoodRx https://www.goodrx.com › ... › Diet and Nutrition

Red Dye 40: Side Effects, Foods, Alternatives, & More

Jul 26, 2022 — Red dye 40 is currently 1 of 9 color additives certified by the FDA. The others are: Blue No. 1. Blue No. 2. Green No. 3. Orange B.

[https://www.google.ca/advanced\\_search](https://www.google.ca/advanced_search)

Google

Advanced Search

Find pages with...

all these words:

this exact word or phrase:

any of these words:

none of these words:

numbers ranging from:  to

Then narrow your results by...

language:

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last update:

site or domain:

terms appearing:

file type:

usage rights:



**Advanced Search**



allintext: red dye food OR additives filetype:pdf



Saint Peter's University

<https://repository.saintpeters.edu> > downloads [PDF](#) :

## A study of the effects of Allura Red AC (Red 40) and ...

On the other side of the argument, the Internal Association of Color Manufacturers (a trade association for food dye ... Food additives and hyperactive behaviour ...



ScienceDirect

<https://www.sciencedirect.com> > article > pii [PDF](#) :

## Adverse reactions to food additives in children

by A Lemoine · 2020 · Cited by 18 — Health professionals and parents should be reassured about the low risk of food dye intolerance or allergies. Keywords: Carmine red; Cochineal red...



## Health vs Economic Impacts of Artificial Food Dyes

by S Racanelli · 2023 — "The effects of food and food additives on behaviors." Intl J Health ...  
"Diet and nutrition: the artificial food dye blues." (2010): A428-A428.



Environmental Working Group

<https://www.ewg.org> > sites > default > files > E... [PDF](#) :

## EWG'S DIRTY DOZEN FOOD CHEMICALS

But more than 10,000 chemicals are allowed in food sold in the U.S. Some are direct additives, such as ... Synthetic food dye can be found in many types of food ...  
2 pages



Centers for Disease Control and Prevention (.gov)

<https://stacks.cdc.gov> > cdc > cdc\_77737\_DS1 [PDF](#) :

## Food Additives and Child Health

by L Trasande · 2018 · Cited by 155 — ... Red 3, Red 40, Citrus Red 2, and Orange B ... Food additives permitted for direct addition to food for human consumption - food preservatives -. 17 pages

# The Chemistry of Food Colorings

ChemMatters | October 1, 2015



Credit: Shutterstock

by Brian Rohrig

Downloads: [Download Article \(PDF\)](#) | [Spanish Translation of Article \(PDF\)](#) | [Teacher's Guide \(.docx\)](#)

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Would you drink black water? Clear Pepsi? How about using pink butter or green ketchup? Believe it or not, these products actually existed, and not that long ago either. But there is a reason these food fads did not last. Consumers prefer that the color of food matches its flavor.

The link between color and taste is logical. Since oranges are orange, we expect orange-colored drinks to be orange-flavored. Red drinks should taste like cherries, and purple drinks should taste like grapes. If a food is multicolored, it could be moldy and should not be eaten, unless you are eating blue cheese—which gets its distinct flavor from mold!

# Why Is Red Dye No. 3 Banned in Cosmetics but Still Allowed in Food?

Food safety advocates recently petitioned the FDA for a ban decades after studies found high doses of the artificial color could cause cancer in rats. Here's what you need to know.

By Lauren Kirchner

Published November 14, 2022 | Updated October 31, 2023



Food products can still contain Red Dye No. 3.  
Photo illustration: Lacey Browne/Consumer Reports, Getty Images. Shutterstock

More than 30 years ago the Food and Drug Administration told the cosmetics industry that it could no longer use an artificial color called FD&C Red No. 3, also known as Red Dye No. 3 and Red Dye 3. That's because high doses of it had been found to cause cancer in animals.

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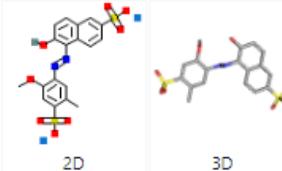


## Allura Red AC

PubChem CID

33258

### Structure



### Chemical Safety

[Laboratory Chemical Safety Summary \(LCSS\) Datasheet](#)

### Molecular Formula

C<sub>18</sub>H<sub>14</sub>N<sub>2</sub>Na<sub>2</sub>O<sub>8</sub>S<sub>2</sub>

### Synonyms

Allura Red AC

25956-17-6

Allura Red

Allura red AC dye

Food Red No. 40

[View More...](#)

496.4 g/mol

Computed by PubChem 2.2 (PubChem release 2021.10.14)

### Fluorescent Ink and Chemical Sensing Towards Tartrazine Based on Nitrogen-Doped Carbon Dots Derived from Durian Seed Waste

Publication Name: Waste and Biomass Valorization

Publication Date: 2023-04-06

DOI: [10.1007/s12649-023-02109-4](https://doi.org/10.1007/s12649-023-02109-4)

### Meat food fraud risk in Chinese markets 2012–2021

Publication Name: npj Science of Food

Publication Date: 2023-04-03

PMCID: [PMC10070328](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10070328/) PMID: [37012259](https://pubchem.ncbi.nlm.nih.gov/compound/37012259) DOI: [10.1038/s41538-023-00189-z](https://doi.org/10.1038/s41538-023-00189-z)

### Anoxybacillus: an overview of a versatile genus with recent biotechnological applications

Publication Name: World Journal of Microbiology and Biotechnology

Publication Date: 2023-03-30

PMID: [36995480](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC36995480/) DOI: [10.1007/s11274-023-03583-7](https://doi.org/10.1007/s11274-023-03583-7)

### Modeling of artificial neural networks for the adsorption of synthetic dyes in an aqueous solution using double layer hydroxides

Publication Name: MRS Advances

Publication Date: 2023-03-17

DOI: [10.1557/s43580-023-00535-z](https://doi.org/10.1557/s43580-023-00535-z)

### Status of food colorants in India: conflicts and prospects

Publication Name: Journal fur Verbraucherschutz und Lebensmittelsicherheit = Journal of consumer protection and food safety

Publication Date: 2023-03-13

PMCID: [PMC10009361](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10009361/) PMID: [37265594](https://pubchem.ncbi.nlm.nih.gov/compound/37265594) DOI: [10.1007/s00003-023-01427-y](https://doi.org/10.1007/s00003-023-01427-y)

## CONTENTS

### Title and Summary

### 1 Structures

### 2 Names and Identifiers

### 3 Chemical and Physical Properties

### 4 Spectral Information

### 5 Related Records

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### 12 Associated Disorders and Diseases

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### 16 Biological Test Results

### 17 Classification

### 18 Information Sources



Allura Red AC

Article Talk

From Wikipedia, the free encyclopedia

(Redirected from [Red dye 40](#))

*"E129"* redirects here. For other uses, see [E129 \(disambiguation\)](#).

Allura Red AC is a red azo dye that goes by several names, including [FD&C Red 40](#).<sup>[1]</sup> It is used as a food dye and has the E number [E129](#).

It is usually supplied as its red sodium salt, but can also be used as the calcium and potassium salts. These salts are soluble in water. In solution, its maximum absorbance lies at about 504 nm.<sup>[2]</sup><sup>[3]</sup>

Allura Red, FD&C Red No. 40 is manufactured by coupling diazotized 5-amino-4-methoxy-2-toluenesulfonic acid with 6-hydroxy-2-naphthalene sulfonic acid in an azo coupling reaction.<sup>[3]</sup>

**Use as a consumable coloring agent** [edit]

Allura Red AC is a popular dye used worldwide. Annual production in 1980 was greater than 2.3 million kilograms.<sup>[4]</sup> It was originally introduced as a replacement for [amaranth](#) in the United States.<sup>[5]</sup>

The European Union approves Allura Red AC as a food colorant, but EU countries' local laws banning food colorants are preserved.<sup>[6]</sup> In the United States, Allura Red AC is approved by the FDA for use in cosmetics, drugs, and food. When prepared as a [lake pigment](#) it is disclosed as Red 40 Lake or Red 40 Aluminum Lake. It is used in some tattoo inks and is used in many products, such as [cotton candy](#), [soft drinks](#), [cherry](#)-flavored products, children's medications, and [dairy](#) products. It is occasionally used to dye medicinal pills, such as the [antihistamine fexofenadine](#), for purely aesthetic reasons.<sup>[7]</sup> It is by far the most commonly used red dye in the United States,<sup>[8]</sup> completely replacing [amaranth \(Red 2\)](#) and also replacing [erythrosine \(Red 3\)](#) in most applications due to the negative health effects of those two dyes.<sup>[9]</sup>

**Studies on safety** [edit]



Allura Red has been heavily studied by food safety groups in North America and Europe, and remains in wide use.

The UK's Food Standards Agency commissioned a study of six food dyes ([tartrazine](#), Allura red, [Ponceau 4R](#), [Quinoline Yellow](#), [sunset yellow](#), [carmoisine](#) (dubbed the "Southampton 6")), and [sodium benzoate](#) (a preservative) on children in the general population, who consumed them in beverages.<sup>[10][11]</sup> The study found "a possible link between the consumption of these artificial colours and a sodium benzoate preservative and increased hyperactivity" in the children;<sup>[10][11]</sup> the advisory committee to the FSA that evaluated the study also determined that because of study limitations, the results could not be extrapolated to the general population, and further testing was recommended.<sup>[10]</sup>

**Allura Red AC**

Names

Disodium 6-hydroxy-5-[(2-methoxy-5-methyl-4-sulphonophenyl)diazényl]naphthalene-2-sulfonate

Preferred IUPAC name

Other names

Disodium 6-hydroxy-5-[(2-methoxy-5-methyl-4-sulphonophenyl)azo]-2-naphthalenesulfonate  
Allura Red  
Food Red 17  
C.I. 18035  
FD&C Red 40  
E140  
2-Naphthalenesulfonic acid, 6-hydroxy-5-((2-methoxy-5-methyl-4-sulphonophenyl)azo)-, disodium salt

Identifiers

CAS Number 25956-17-6 ✓  
3D model (JSmol) Interactive image ✎  
ChEMBL ChEMBL174821 ✎  
ChemSpider 11588224 ✎ ✓  
ECHA InfoCard 100.043.047 ✎ ✎  
E number E129 (colours)  
PubChem CID 6093299 ✎  
UNII WZB9127XOA ✎ ✓  
CompTox DTXSID4024436 ✎ ✎  
Dashboard (EPA)

InChI [show]  
SMILES [show]

Properties

# Library Seminar Agenda

- SCIE Library Research Guide
- Databases – lots of them!
- Citation management
- Where, how and when to get help

<https://brocku.ca/library/>

The screenshot shows the homepage of the Brock University Library website. The header features a red navigation bar with links for Main, Search, Use the Library, Teaching Support, Publishing Support, Research Support, Locations, About, and Contact. Below the header is a large banner image of a building with bare trees in front. On the left side of the banner is the "omni" logo. To the right of the banner is a "Today's Hours" section listing opening times for various locations. Below the banner are six service icons: My Library Account, Print, Copy & Scan, Bookable Study Space, Citation Guides, Research Guides, and Wellness at the Library. A "Events & Workshops" section follows, featuring three event cards: "Grad Student Writing Café" on January 11, "3D Modeling in Blender Part: 1" on January 16, and "3D Modeling in Blender Part: 2" on January 17.

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**Today's Hours**

James A. Gibson Library	8am – 11pm
Archives & Special Collections	9:30am – 4:30pm
Makerspace	10am – 4pm
Map, Data & GIS Library	9am – 4pm
Ask Us Chat	10am – 10pm

ALL HOURS >

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**EVENTS & WORKSHOPS**

**Grad Student Writing Café** JAN 11

**3D MODELING IN BLENDER PART: 1** JAN 16 Makerspace

**3D MODELING IN BLENDER PART: 2** JAN 17 Makerspace

Science

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# Science

What is this guide for?

This guide has been designed as a general program guide and is curated by [Brock librarians](#). It features links to most often used resources such as databases for books, peer-reviewed journal articles, theses, dissertations, open educational resources (OEDs), patents, standards, and more. Use the tabs on the left to navigate through the web page.

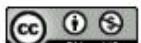
SCIE 1P51 Library Seminar Winter 2024 presentation ppt [slides](#) (PDF) and YouTube video.



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## Science

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## Grey Literature

Grey literature **databases** identify resources that are key to research and scholarship. Many are open resources that go through a quality control process before they are published.

**Definitions** are scholarly dictionaries, encyclopedias and handbooks that help define terms and provide additional context. A select list includes:

[Dictionary Plus: Science & Technology](#) (2016)

[Gale Encyclopedia of Science](#) (2021)

[Encyclopedia of Environmental Issues](#) (2019)

[Wikipedia](#)

Open Education Resources (OERs) are digital ebooks and learning objects that can be used as open textbooks on a wide variety of general and disciplinary subjects.

- [Oxford Reference](#) ◻
  - Interdisciplinary
  - Includes Oxford Quick Reference of core subject, quotation, and language dictionaries and Oxford Reference Library of companions and multi-volume encyclopedias for longer, in-depth, essays and specialist definitions.
  - Limited to 5 simultaneous users.
  - [Permitted Uses](#)
- [more info...](#)
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  - In-depth, peer-reviewed essays and introductions by leading scholars in Archaeology, Business & Management, Classical Studies, Criminology, Economics & Finance, History, Law, Linguistics, Literature, Music, Neuroscience, Philosophy, Physical Sciences, Political Science, Psychology, Religion, and Sociology
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## Books

Scholarly books or ebooks range from introductory textbooks, handbooks, and subject-specific resources. A select list of [databases](#) that identify books/ebooks are listed below.

Many students find [Open Education Resources](#) (OERs) that are open and free textbooks for a variety of courses and subject areas helpful.

The most straightforward way to find books is by using [Omni](#) our local search interface!

## Book & E-Book databases

- [Omni](#) ⓘ
  - Brock's largest Interdisciplinary search tool
  - Millions of journal articles, books & ebooks, newspapers, videos, magazines and more!
- [Google Books](#)  
Select "Limited preview and full view" and "Books" for best results.
- [Directory of Open Access Books \(DOAB\)](#) ⓘ
  - Interdisciplinary
  - Find full text, peer-reviewed books and edited volumes.
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  - World's largest network of library-based collections.
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## Articles



Journal articles are scholarly works that go through a quality control process called **peer-review** before they are published.

Note that **Web of Science Core Collection** includes scholarly peer review articles from important scholarly journals with the ability to limit searches by date, relevance, language, format and importance. A great source to find current scholarly peer-review articles.

Several databases provide access to regional, national and international **news** articles.

**Omni** using the Advanced Search search engine searches for articles by selecting Resource Type: Articles.

A select list of open and Brock Library subscribed **databases** that include scholarly articles are listed below.

- [Google Scholar](#) ↗

- Find Peer-reviewed papers, theses, books, abstracts and articles, from academic publishers, professional societies, repositories, universities and other scholarly organizations
- Off-Campus access to Brock resources is available to users who configure their Google Scholar Settings as follows:
  1. Click on [Scholar Settings](#)
  2. Select 'Library links' from the left menu
  3. Type Brock in the Library links box
  4. Select Brock in the resulting list
  5. Click on the 'Save' button
  6. Follow the Find it @ Brock links

- [Academic Search Complete](#) ↗

- Scholarly resources across all disciplines
- [Permitted Uses](#)

[more info...](#)

- [Web of Science Complete](#) ↗

- Interdisciplinary
- Searches all databases on the WoS platform including book, conference proceeding and journal citation indexes, chemical data, and indexes in the biological sciences.
- Includes Proquest Dissertations and Theses Citation Index.
- [Permitted Uses](#)

- [Scholars Portal E-Journals](#) ↗

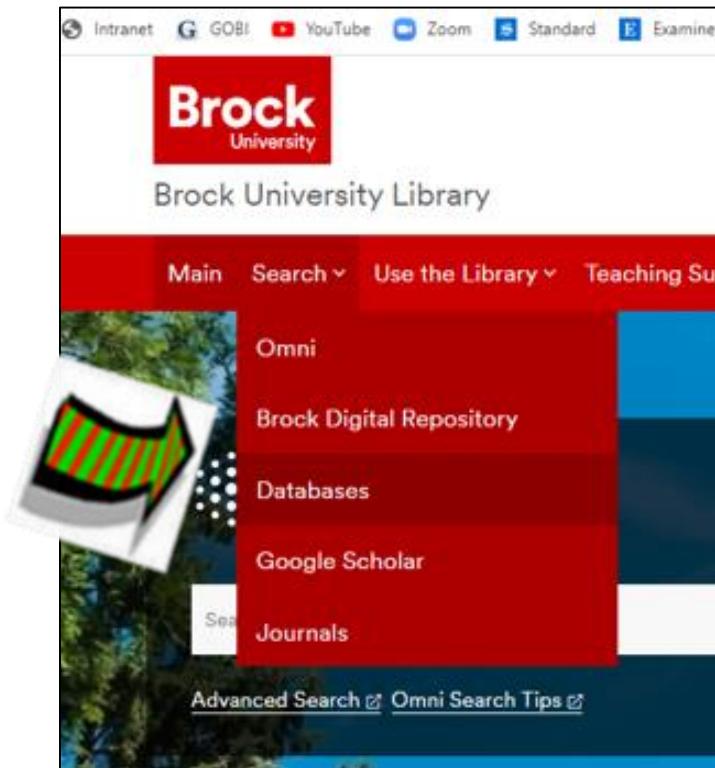
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<https://brocku.ca/library/>

<https://researchguides.library.brocku.ca/az/databases>



# Find a Database

Find a full list of databases the library subscribes to. Use the subject list to find databases for your program!

Database Title / Keyword	Subjects	Types

## 415 Databases

All A B C D E F G H I J K L M N O P Q R S T U V W X Y Z #

### A

#### [Academic Search Complete](#) ↗

- Scholarly resources across all disciplines.
- [Permitted Uses](#)

#### [Access Engineering](#) ↗

- An engineering reference and teaching platform that provides interdisciplinary engineering content integrated with analytical teaching and learning tools.
- Search the latest editions of renowned engineering handbooks, upper-level engineering textbooks, as well as hundreds of other expert references.
- Also includes DataVis, an interactive visualization tool to understand material properties.
- [Permitted Uses](#)

Academic Search Complete, AgeLine, [BASE](#), BioOne Complete, [bioRxiv](#), [CORE](#), [Dimensions](#), [Directory of Open Access Journals \(DOAJ\)](#), Education Source, Elicit, Embase, [figshare](#), [Google](#), Advanced Google, Google Books, [Google Scholar](#), Keenious, [MEDLINE](#), Omni, [Open Alex](#), [OSF Preprints](#), Oxford Reference, Paperity, PLOS, [ResearchGate](#), [ResearchRabbit](#), Scholars Portal E-Journals, [SciELO](#), [Scite](#), [Scilit](#), Semantic Scholar, The Lens, Web of Science Complete, [WorldWideScience.org](#), WorldCat, Zenodo...

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Search fields

Any field contains "red dye\*" AND Any field contains food\* OR additive\*

+ ADD A NEW ROW    

Resource Type

Articles

Language

English

Start Date:

Day Month 2023

End Date:

Day Month 2024

Any field contains "red dye\*" AND Any field contains food\* OR additive\* 

red dye number 40 as a food additive



Brock Library + Omni Libraries



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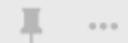
DISMISS

## Modify your results



0 selected 1-10 of 10 Results

Personalize



Expand search beyond Brock's collection

Sort by Relevance

## Availability ▾

Available online

Peer-reviewed Journals

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## Resource Type ▾

Articles (6)

Magazine Article (2)

Theses & Dissertations (1)

Newsletter Article (1)

Newspapers search >



ARTICLE

### Lack of genotoxicity in vivo for food color additive Allura Red AC

Bastaki, Maria ; Farrell, Thomas ; Bhusari, Sachin ; Pant, Kamala ; Kulkarni, Rohan

Food and chemical toxicology, 2017, Vol.105, p.308-314

“... “Food, Drug, and Cosmetic” (FD&C) Red No. 40, and in Europe as food color additive with E number 129...”

PEER-REVIEWED

Available Online >



ARTICLE

### Scientific Opinion on the re-evaluation of Allura Red AC (E 129) as a food additive

EFSA Panel on Food Additives and Nutrient Sources Added to Food

EFSA journal, 2009, Vol.7 (11), p.1327-n/a

“... evaluating the safety of Allura Red AC (E 129). Allura Red AC has been previously evaluated by the Joint FAO/WHO Expert Committee on Food Additives (JECFA)...”

PEER-REVIEWED OPEN ACCESS

Available Online >



## Modify your results

Expand search beyond Brock's collection

Sort by Date-newest ▾

### Availability ▾

Available online

Peer-reviewed Journals

Open Access

### Resource Type ▾

Articles (46)

Newspapers search >

### Publication Date ▾

From

2021

To

2024

Refine

### Subject ▾

### Database ▾

### Language ▾

### Journal Title ▾

0 selected PAGE 1 1-10 of 46 Results ▾  Personalize

1 ARTICLE  
[Chitosan vs chitin: Comparative study of functional pH bioindicators synthesized from natural red dyes and biopolymers as potential packaging additives](#)  
Szadkowski, Bolesław ; Marzec, Anna  
Food hydrocolloids, 2024, Vol.150, p.109670, Article 109670  
 PEER-REVIEWED  
 Available Online >  
Y " " E ⚡ ...

2 ARTICLE  
[Recent advances in electrochemical sensors based on nanomaterials for detection of red dyes in food products: A review](#)  
Mohamed, Aya M. ; Fouad, Fouad Hassan ; Raouf Fayek, George ; El Sayed, Kareem Mohsen ; Ahmed, Mohamed Nabil ; Mahmoud, Raghda Zayed ; El Nashar, Rasha M.  
Food chemistry, 2024, Vol.435, p.137656-137656, Article 137656  
"....•The limits of detection and recoveries in food samples were evaluated. Red dyes as Allura Red (E129), Amaranth (E124), Ponceau 4R (E123), Erythrosine (E127) and Carmoisine (E122...)"  
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The continued use of Red Dye as a food additive has significant consequences for both science and society. Research has shown that many food dyes, including Red Dye, raise health concerns due to their potential carcinogenicity, genotoxicity, and hypersensitivity reactions ([Ko 2012](#), [Potera 2010](#)). These concerns are particularly relevant for children, as artificial food dyes have been linked to behavioral problems ([Potera 2010](#)). Furthermore, the use of Red Dye in food products has been found to have adverse effects on vital organs ([Sharma 2008](#)). The health implications of synthetic food dyes, including Red Dye, have led to a growing concern, with natural food colorants being considered a safer alternative ([Okafor 2016](#)). Therefore, the continued use of Red Dye in our food supply poses significant risks to public health and underscores the need for further research and regulation in this area.

Risk assessment of azo dyes as food additives: Revision and discussion of data gaps toward their improvement.  
Caroline Ramos-Souza +3  
*Comprehensive Reviews in Food Science and Food Safety*  
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Red Tomato Products as an Alternative to Reduce Synthetic Dyes in the Food Industry: A Review  
Tiago Alves Castro +8  
*Molecules*  
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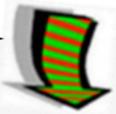
Effects of four food dyes on development of three model species, *Cucumis sativus*, *Artemia salina* and *Danio rerio*: Assessment of potential risk for the environment.  
Chiara Maria Motta +9  
*Environmental pollution*  
2019 21 citations DOI ↗

Assessment of the Health implications of Synthetic and Natural Food Colourants – A Critical Review  
S. Okafor +2  
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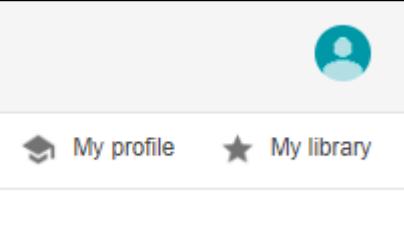
[PDF] Mitotic aberrations induced by orange red (a **food additive** dye) as a potential genotoxin on root tip cells of onion (*Allium cepa L.*)  
SK Tripathy, DA Rao - International Food Research Journal, 2015 - researchgate.net

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Developmental toxicity and psychotoxicity of FD and C **red dye No.** 40 (allura red AC) in rats

CV Vorhees, RE Butcher, RL Brunner, V Wootten... - Toxicology, 1983 - Elsevier  
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Color **additives**: Is successor to **red dye No.** 2 any safer?

PM Boffey - Science, 1976 - science.org  
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A developmental toxicity and psychotoxicity evaluation of FD and C **red dye# 3** (erythrosine) in rats

CV Vorhees, RE Butcher, RL Brunner, V Wootten... - Archives of..., 1983 - Springer  
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Toxicity of **food colours and additives**: A review

OE Thomas, OA Adegoke - African Journal of Pharmacy and ..., 2015 - a...org  
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Background: Although there is an increasing need for eco-friendly and non-toxic food colorants, plant-based colors have shown to be a promising alternative to synthetic food colors. The natural pigment (betalain) was extracted from red beetroot utilizing a magnetic stirrer shaking apparatus in the current study. Objective: The purpose of this study was to evaluate the effect of betalain (natura ... Show more

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# Red beetroot betalains as a novel source of colorant in ice-cream as compared with red dye 40 (E129)

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Ali, RTM (Ali, Ruaa Tariq Mohamed) [1] ; Jameel, QY (Jameel, Qaswaa Yousif) [1]

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Abstract

**Background:** Although there is an increasing need for eco-friendly and non-toxic food colorants, plant-based colors have shown to be a promising alternative to synthetic food colors. The natural pigment (betalain) was extracted from red beetroot utilizing a magnetic stirrer shaking apparatus in the current study. **Objective:** The purpose of this study was to evaluate the effect of betalain (natural pigment) and red dye 40 (synthetic pigment), on the chemical, microbiological, and sensory properties of ice cream. **Materials and Methods:** Betalain and red dye 40 were added into ice cream at variable concentrations of 50, 100, and 200 mg/mL. Specimens were stored for 70 days and evaluated every ten days. **Results:** The values of titratable acidity, pH, fat, protein, total count of microorganisms, and sensory characteristics scored higher for betalain ice cream in comparison to red dye 40 ice cream. Nevertheless, betalain doses of 50, 100, and 200 mg/mL have been reported to have a significant 70-day storage activity in ice cream, when compared to mixtures containing 50, 100, and 200 mg/mL of red dye 40 after 70 days. **Conclusion:** According to the findings, betalain may be utilized as a natural pigment and food preservative to boost stability during storage.

Keywords

**Author Keywords:** Antioxidants; Betalain; Functional foods; Red beetroot; Red Dye 40 (E129); synthetic colors; Storage period

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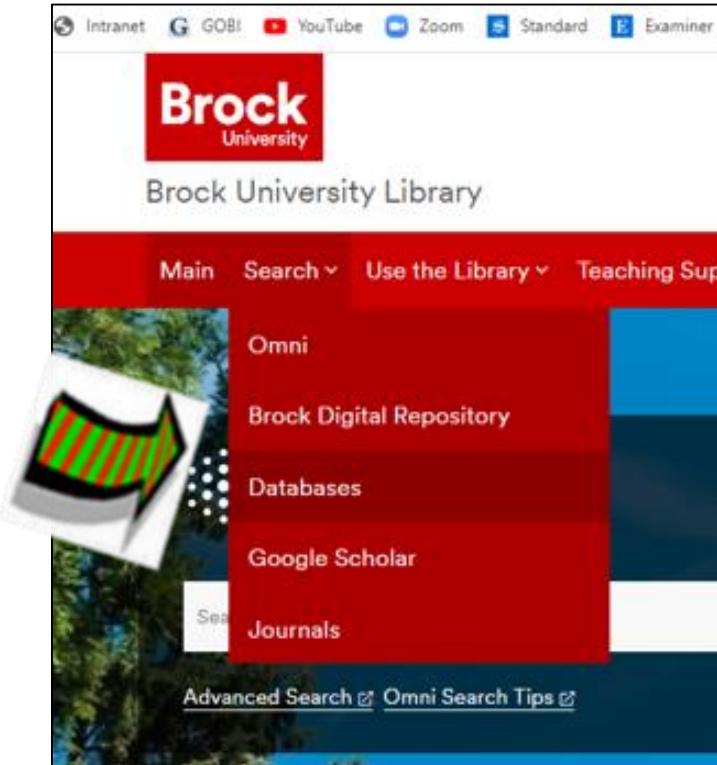
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Objective: The purpose of this study was to evaluate the effect of betalain (natural

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## Red beetroot betalains as a novel source of colorant in ice-cream as compared with red dye 40 (E129)

Ruwa Tariq Mohamed Ali, Qaswaa Yousif Jameel \*

Department of Food Science, Colleges of Agricultural and Forestry, University of Mosul, Mosul, Iraq

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Submission Date: March 29<sup>th</sup>, 2023; Acceptance Date: April 18<sup>th</sup>, 2023; Publication Date: April 26<sup>th</sup>, 2023

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### ABSTRACT

**Background:** Although there is an increasing need for eco-friendly and non-toxic food colorants, plant-based colors have shown to be a promising alternative to synthetic food colors. The natural pigment (betalain) was extracted from red beetroot utilizing a magnetic stirrer shaking apparatus in the current study.

**Objective:** The purpose of this study was to evaluate the effect of betalain (natural pigment) and red dye 40 (synthetic pigment), on the chemical, microbiological, and sensory properties of ice cream.

**Materials and Methods:** Betalain and red dye 40 were added into ice cream at variable concentrations of 50, 100, and 200 mg/mL. Specimens were stored for 70 days and evaluated every ten days.

**Results:** The values of titratable acidity, PH, fat, protein, total count of microorganisms, and sensory characteristics scored higher for betalain ice cream in comparison to red dye 40 ice cream. Nevertheless, betalain doses of 50, 100, and 200 mg/mL have been reported to have a significant 70-day storage activity in ice cream, when compared to mixtures containing 50, 100, and 200 mg/mL of red dye 40 after 70 days.

**Conclusion:** According to the findings, betalain may be utilized as a natural pigment and food preservative to boost stability during storage.

**Keywords:** Antioxidants, Betalain, Functional foods, Red beetroot, Red Dye 40 (E129), synthetic colors, Storage period

### METHODS

**Chemicals and Reagents:** In a local market in Mosul, Iraq, we bought raw cow's milk and red beetroot. All materials and chemicals were purchased from Scharlab S.L. (Spain), and they were of the highest analytical grades currently offered commercially.

### Preparation of red beetroot extract

red beetroot was cleaned and washed thoroughly and provided by [22]. Briefly, the beetroot was cut into small pieces, washed, and then powder was macerated in ethanol for 24 h before being shaken.

After that, the solution was filtered through Whatman filter paper 0.15 cm. The resulting solution was concentrated by evaporation until it reached the required consistency.

**Quantification of betalains in red beetroot extract: HPLC analysis** was performed to evaluate the betalain in the beetroot extract. The data revealed that red beetroot extract contained 1.5% betalains.

**Table 4: Effect of betalains and red dye 40 (E129), on sensory characteristics (Flavor and Taste, Body and Texture, Color and Appearance, and Melting Resistance) during the storage period.**

Ice-cream formulation (ICF)	Storage period (Day 1)	Storage period (Day 70)			
		ICF0	ICF1	ICF2	ICF3
		7.5100±0.0100 <sup>a</sup>	8.1400±0.0100 <sup>a</sup>	8.0100±0.0100 <sup>a</sup>	8.0167±0.0152 <sup>b</sup>
		7.9100±0.0100 <sup>a</sup>	8.1600±0.0200 <sup>a</sup>	7.6400±0.0100 <sup>a</sup>	7.7600±0.0100 <sup>a</sup>
		8.8700±0.0100 <sup>c</sup>	8.1700±0.0200 <sup>c</sup>	7.4300±0.0100 <sup>c</sup>	7.3800±0.0100 <sup>c</sup>
		8.9800±0.0100 <sup>a</sup>	8.1800±0.0200 <sup>a</sup>	7.3200±0.0100 <sup>a</sup>	7.3367±0.0404 <sup>a</sup>
		7.9200±0.0100 <sup>d</sup>	8.2100±0.0100 <sup>b</sup>	7.2900±0.0100 <sup>d</sup>	7.1900±0.1646 <sup>d</sup>
		8.9600±0.0100 <sup>a</sup>	8.2267±0.0057 <sup>a</sup>	7.2800±0.0100 <sup>a</sup>	6.9400±0.0100 <sup>a</sup>
		8.9800±0.0100 <sup>a</sup>	8.2400±0.0100 <sup>a</sup>	6.9400±0.0100 <sup>a</sup>	6.5100±0.0100 <sup>a</sup>



### CONCLUSION

According to this study, adding betalain to ice cream had a big impact on the ice cream's chemical and microbiological features.

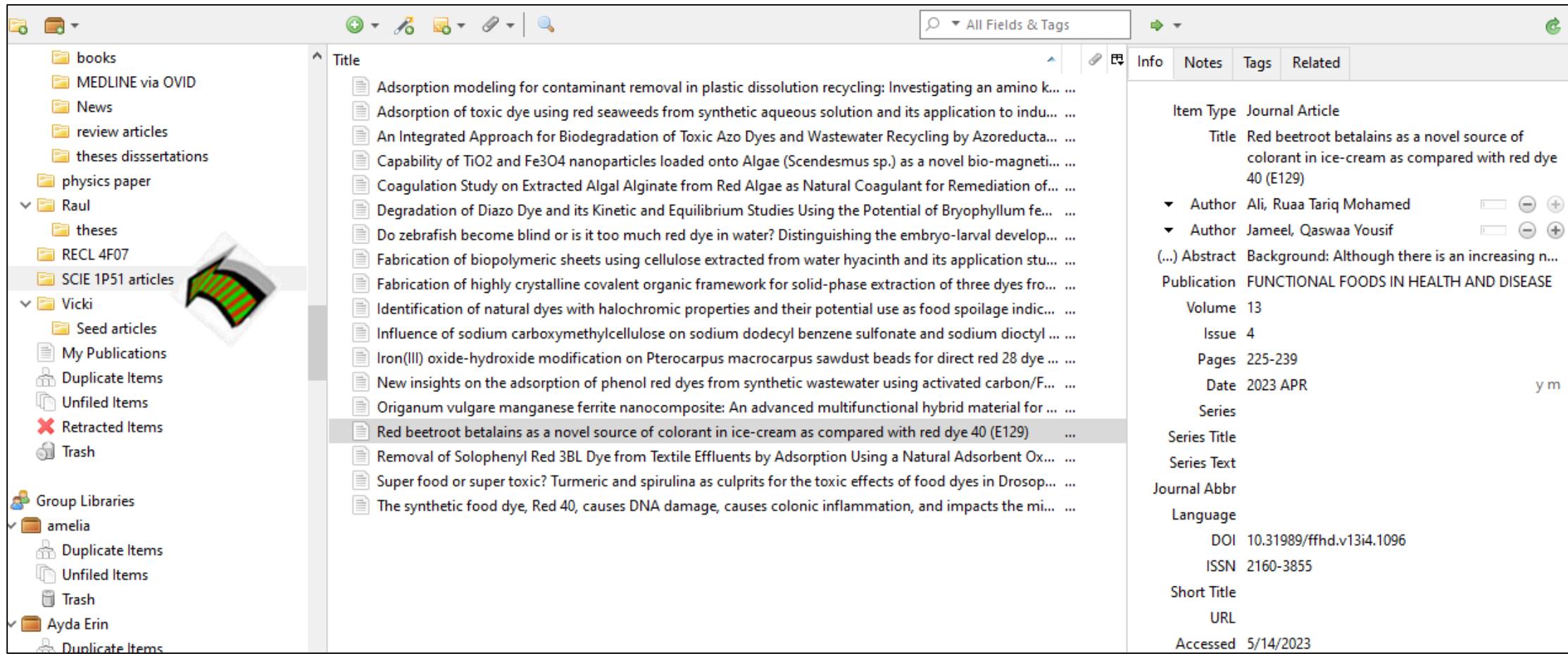
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[Cardenas-Rojas, Andy A](#)<sup>2</sup> (AUTHOR) andy.cardenas.r@uni.pe  
[Nagles, Edgar](#)<sup>1</sup> (AUTHOR) enaglesv@unmsm.edu.pe  
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Abstract: This report describes a new electroanalytical application for the detection of Allura Red (AR) using a carbon paste electrode (CPE) modified with lanthanide oxide and titanium oxide (LaOX-TiOX/CPE). The standard potential ( $E_0$ ) for oxidation of AR was obtained from the  $E$  (V) vs. pH relation with the regression equation  $E_p(V) = -0.038pH + 0.922$ , where the intercept on the axis  $E_p(V)$  is equal to the standard potential. Moreover, the anodic peak current for AR was increased almost 160 % compared to the unmodified electrodes, and this current increase allowed us to obtain a detection limit of 0.09  $\mu\text{mol/L}$ . The active surface area of the modified electrode La-TiOX/CPE is reported for the first time in this report and was increased by almost 200 % compared to the unmodified electrodes. The usefulness of the new method was tested by analyzing real food samples with acceptable results. The real samples do not need pretreatment before analysis [ABSTRACT FROM AUTHOR]

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## Detection of Allura Red in Food Samples Using Carbon Paste Modified with Lanthanum and Titanium Oxides

Anthony Vargas-Varela,<sup>[a]</sup> Andy A. Cardenas-Riojas,<sup>\*[b]</sup> Edgar Nagles,<sup>\*[a]</sup> and John Hurtado<sup>[c]</sup>

This report describes a new electroanalytical application for the detection of Allura Red (AR) using a carbon paste electrode (CPE) modified with lanthanide oxide and titanium oxide ( $\text{La}_{\text{ox}}\text{-Ti}_{\text{ox}}$ /CPE). The standard potential ( $E^{\circ}$ ) for oxidation of AR was obtained from the  $E$  (V) vs. pH relation with the regression equation  $E_p(V) = -0.038\text{pH} + 0.922$ , where the intercept on the axis  $E_p(V)$  is equal to the standard potential. Moreover, the anodic peak current for AR was increased almost 160% compared to the unmodified electrodes, and this current increase allowed us to obtain a detection limit of 0.09  $\mu\text{mol/L}$ . The active surface area of the modified electrode  $\text{La}_{\text{ox}}\text{-Ti}_{\text{ox}}$ /CPE is reported for the first time in this report and was increased by almost 200% compared to the unmodified electrodes. The usefulness of the new method was tested by analyzing real food samples with acceptable results. The real samples do not need pretreatment before analysis

### Introduction

The number of reports aimed at detecting AR has increased in recent years, and the evidence is supported by various reviews published in recent years. Most reports have focused on advances in extraction and analytical techniques to detect AR over the last two decades.<sup>[1]</sup> The first techniques used to detect AR involved thin-layer chromatography at the beginning of the 1990 s,<sup>[2]</sup> and currently, High performance liquid chromatography (HPLC) technique is more often used and is more sensitive for detecting AR, with detection limits between 10.0 and 50.0  $\mu\text{mol/L}$ ,<sup>[3]</sup> but with high instrumental costs. Other spectrometry techniques are also commonly used to detect the high values of molar absorption presented by AR.<sup>[4]</sup> These techniques are more economical than HPLC techniques but of these studies are motivated cause to people who consume the toxicity of AR were reported. In recent studies continue to not been possible to establish the development of cancerous

increased, and the innovation is the development of modified electrodes.<sup>[5–10]</sup>

Some materials used for the development of modified electrodes include polymers, carbon nanotubes, ionic liquids, graphene and surfactants, where detection limits between 0.008 and 0.05  $\mu\text{mol/L}$  have been reported.<sup>[11–13]</sup> On the other hand, the most commonly used substances in the modification of electrodes for AR detection are metal cations such as oxides, including cobalt oxide  $\text{Co}_3\text{O}_4$ ,  $\text{NiO}$ ,  $\text{MoO}_3$  and  $\text{Mn}_2\text{O}_4$ ,<sup>[14–18]</sup> as nanoparticles<sup>[19,20]</sup> and as complexes.<sup>[21,22]</sup>

On the other hand, cobalt and titanium oxides combined with graphene have been used to detect AR, where a detection limit of 0.05  $\mu\text{mol/L}$  was reported.<sup>[23]</sup> However, its ability to detect AR combined with  $\text{La}_2\text{O}_3$  has not been reported.

The use of lanthanide oxide in the modification of electrodes has increased in recent years due to the electrochemical properties of the empty outer shell orbitals, which allow the free and stable movement of electrons in the crystal shell.<sup>[24]</sup> Moreover, lanthanum-modified electrodes have been used, such as  $\text{LaFeO}_3$  for piroxicam detection,<sup>[25]</sup>  $\text{La}_2\text{O}_3$  for guanine and uric acid and thimerosal detection,<sup>[26,27]</sup> and COOLA combined with graphene for dopamine detection.<sup>[28,29]</sup> These reports affirm the catalytic properties of lanthanum in electrode modification.

The combined use of titanium oxide and lanthanum oxides has been reported in the development of lithium-ion battery anodes,<sup>[30]</sup> where modification with La and Ti oxide improves the reversibility and conductivity of the battery. In sensor development, it has been reported that  $\text{La}_x\text{Ti}_{1-x}\text{O}_3$ – $\text{La}_2\text{O}_3$  has been used to detect nitrite in glassy carbon electrode (GCE)<sup>[31]</sup> and that  $\text{La}_{\text{ox}}\text{-Ti}_{\text{ox}}$  has been used to detect tartrazine and sunset yellow in carbon paste.<sup>[32]</sup> In addition, the interaction between the two oxides increases the surface area almost 50 times,<sup>[33]</sup> and the catalytic effect of  $\text{TiO}_2$  is increased.<sup>[32]</sup> On the other hand, the properties of lanthanum oxides have allowed it to be used in recent years in combination with other oxides, such as tin to detect the insecticide carbaryl,<sup>[34]</sup> cobalt to detect bisphenol,<sup>[35]</sup> amlodipine and acetaminophen,<sup>[36]</sup> tantalum for

Electroanalytical techniques are an alternative means for developing new methodologies for AR detection that can obtain sensitive, selective and economical results. In recent years, the development of these techniques to detect AR has

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What are the consequences to science and society  
for the continued use of Red Dye as an  
additive in our food supply?

What are the consequences to science and society for the continued use of Red Dye as an additive in our food supply?

1. Red Dye
2. Food additives
3. Food supply safety

1. “Red Dye” or “Red azo” or “Allura red number 40” or E129
2. “food additive\*” or preserv\* or stabalis\* or emulsif\*
3. safet\* or carcin\* or cancer\* or “food supply” or toxic\*

waste, humans, environment\*, consequences, detection, remov\*...

Synonyms   Antonyms   Definitions   Rhymes   Sentences   Translations   Find Words   Word For

# What is another word for food additives?

Need *synonyms for food additives*? Here's a list of *similar words* from our thesaurus that you can use instead.

**Contexts**

Plural for something added to processed food

Plural for a red coloring dye derived from insects, often used as an additive

**Noun**

Plural for something added to processed food

preservatives   colourants<sup>UK</sup>   colorants<sup>US</sup>   emulsifiers   stabilisers<sup>UK</sup>

stabilizers<sup>US</sup>   thickeners   flavor enhancers

*"Potassium bromate has been used as a **food additive** in the treatment of flour and as a constituent of the neutralizer in cold-wave hair solutions."*

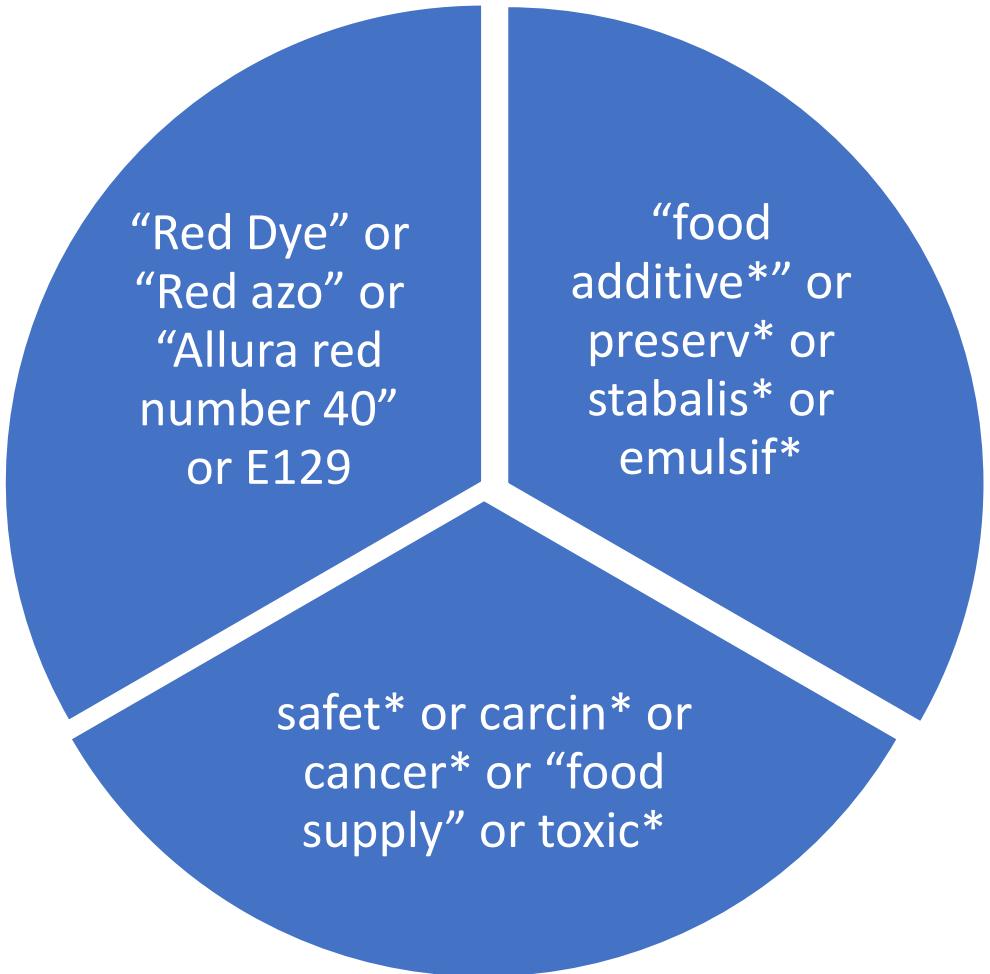
**Noun**

Plural for a red coloring dye derived from insects, often used as an additive

cochineals   colouring<sup>UK</sup>   coloring<sup>US</sup>   dyes   additives



What are the consequences to **science and society** for the continued use of  
**Red Dye** as an **additive in our food supply?**



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1 article

waste, humans, environment\*,  
consequences, detection,  
remov\*...

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DOCUMENTS CITED REFERENCES

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Topic Example: oil spill\* mediterranean “Red Dye” or “Red azo” or “Allura red number 40” or E129 X

And Topic Example: oil spill\* mediterranean “food additive\*” or preserv\* or stabalis\* or emulsif\* X

And Topic Example: oil spill\* mediterranean safet\* or carcin\* or cancer\* or “food supply” or toxic\* X

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Additional keywords/phrases: waste, humans, environment\*, consequences, detection, remov\*...

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# Library Seminar Agenda

- SCIE Library Research Guide
- Databases – lots of them!
- [Citation management](#)
- Where, how and when to get help

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 SCIE Assignment  
Ian Gordon  
Red Dye Paper

This assignment comments on the research question “What are the consequences to science and society for the continued use of Red Dye as a food additive in our food supply?” A scholarly peer-reviewed paper (Ali & Jameel, 2023) commented that...

**References**

Ali, R. T. M., & Jameel, Q. Y. (2023). Red beetroot betalains as a novel source of colorent in ice-cream as compared with Red Dye 40 (E129). *Functional Foods in Health and Disease*, 13(4), 225. <https://doi.org/10.31989/ffhd.v13i4.1096>

# Library Seminar Agenda

- SCIE Library Research Guide
- Databases – lots of them!
- Citation management
- Where, how and when to get help

# Notes to consider:

Article - Related to Course objectives and lectures SCIE 1P50

Not an article in the course readings

Scholarly peer-reviewed journal article

Shouldn't be a sociology, public health or psychology paper

Not too long... not too short

Published in 2023 or 2024

Understandable!

Suitable for writing a summary in your own words



Of personal interest

Available for downloading in PDF format

Handed in by the due date

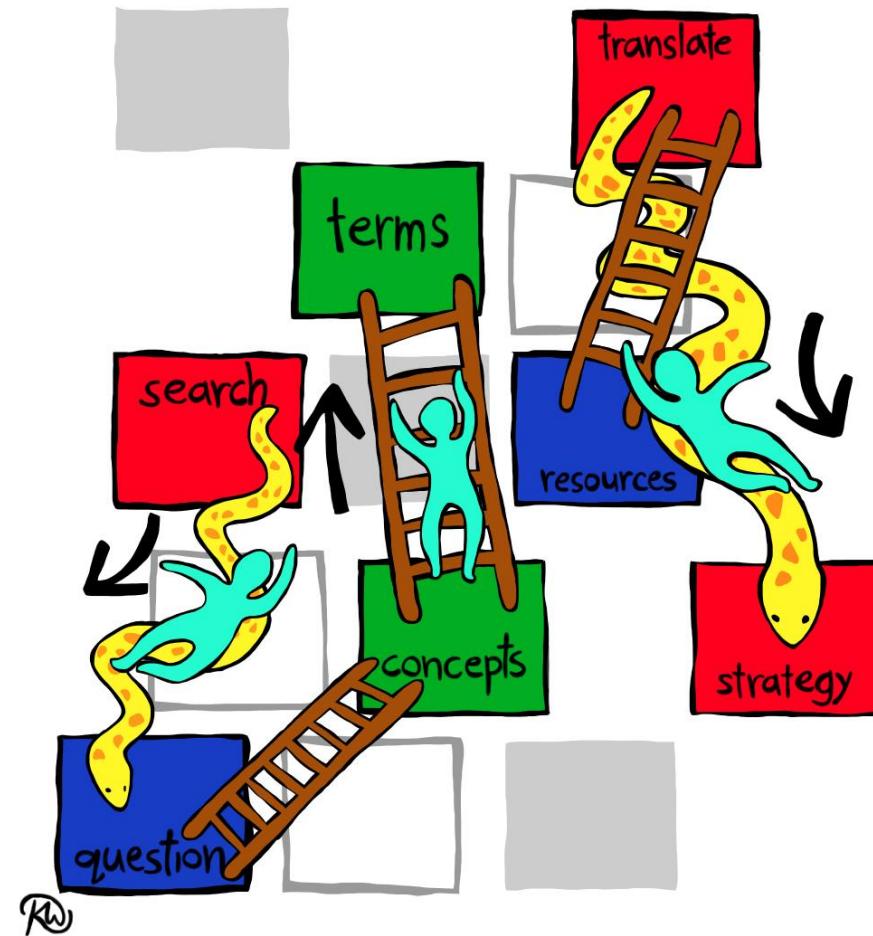
Ask your professor and/or TA for help – they want you to be successful!

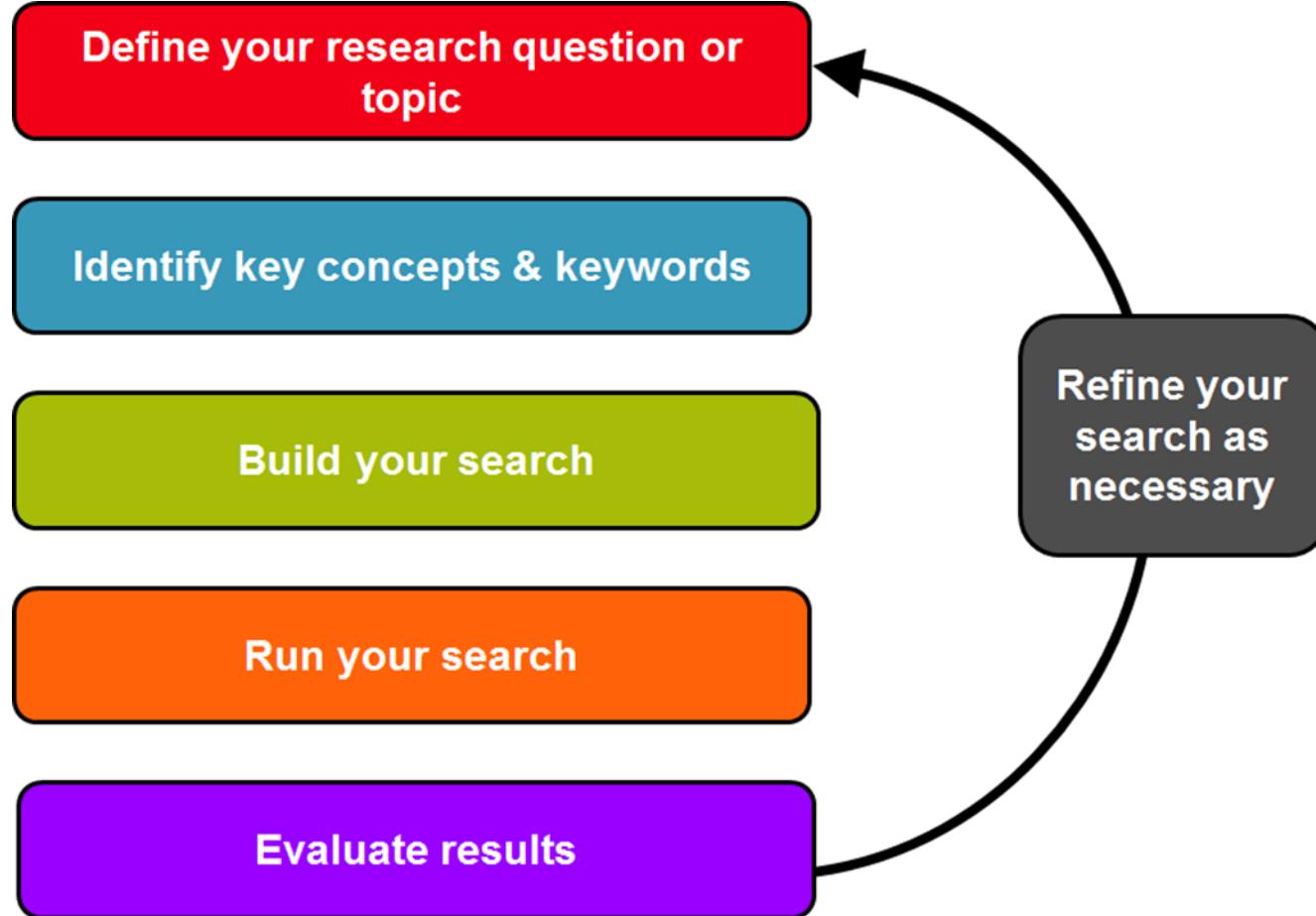
# Learning Outcomes:

- Recognize the value of scholarly research
- Understand the scholarly process of peer review
- Note that there are way too many different databases
- Search each database separately
- Develop different search strategies – be flexible
- Reading article citations effectively
- Read, download, and cite this research
- Use zoterobib and Zotero
- There is no one way to search the literature
- Be open to conducting searches differently
- Research can be messy
- Ask for help if needed
- Become information literate



Searching is a non-linear and potentially iterative process.





The information literate person can:



Information

**IN THIS SECTION**

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VISIT THE ASK US DESK  
BOOK A CONSULTATION  
ATTEND A WORKSHOP  
[WATCH A VIDEO TUTORIAL](#)  
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### What's a Search Strategy?



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### What are "Scholarly" Sources?



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### What does "Peer Review" Mean?



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### Evaluating Sources with RADAR



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# Where can I get help?

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[libhelp@brocku.ca](mailto:libhelp@brocku.ca)

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Book a Consultation

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- develop effective research strategies
- become a confident and independent researcher

## 1. Select One

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<input type="radio"/> Vanja Stojanovic	

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10:30am	12:00pm	12:30pm
1:00pm	3:00pm	3:30pm

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## Appointment Details

**Appointment with:** Ian Gordon (he/him)

**Date:** Tuesday, January 30, 2024

**Start Time:** 2:00pm

**Time Zone:** Eastern Time - US & Canada

**Type:** Research Consultation

**Location:** Research Consultation

**Directions:** Ian is willing to help out in person in ST 1137, find my office using <https://www.youtube.com/watch?v=u3GQa5I-ls8> or meeting virtually by Teams. Please indicate your preference with thanks!

[Change Appointment Details](#)

## Your Details

\* is required

**Full Name \***

James

Gibson

**Email \***

gr19wq@brocku.ca

**Let me know the nature  
of the appointment,  
your program and if this  
is related to a course  
assignment with thanks.  
This will help. Ian \***

Meeting in person to review the SCIE 1P21 assignment for vaccines using Web of Sc

**Confirm Appointment**



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Ian Gordon

Teaching & Learning Librarian  
[igordon@brocku.ca](mailto:igordon@brocku.ca)

Best of luck with this assignment.

Here to help!